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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : AKZO NV

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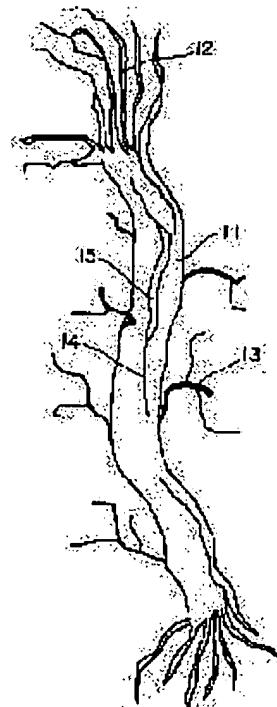
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(54) ARAMID FIBER COMPOSITION AND PREPARATION THEREOF

(57)Abstract:

PURPOSE: To provide and prepare a composition, which contains an aramid synthetic org. fiber and a filler, for producing a formed product having an ultra high strength.

CONSTITUTION: An objective composition is such one that at least a part of fillers have a Moh's hardness of 2 to 9 and further short fibers are split into plural fibrils at their ends, especially the short fibers have cracks along their fiber axis, protruding fibrils and preferably cleavages. A production method of the composition comprises mixing the short fiber comprising the aramid and the filler having a specified Moh's hardness by using a high shear force.



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CLAIMS

[Claim(s)]

[Claim 1] The aramid fiber constituent characterized by for some bulking agents having had the Mohs' hardness of 2-9 at least, and the staple fiber (11) having cloven to two or more fibrils (12) at the end in the constituent which contains at least the synthetic organic staple fiber (11) and bulking agent which consist of an aramid.

[Claim 2] The constituent according to claim 1 which has the crack (14) which the staple fiber (11) met in the fiber axis, and the fibril (13) which jumped out.

[Claim 3] The constituent according to claim 1 or 2 which has the cleavage (15) in which the staple fiber (11) met the fiber axis.

[Claim 4] The constituent given [to claims 1-3] in any 1 term with which a bulking agent contains aluminum $4\text{Si}4\text{O}10(\text{OH})8$ which have about two to 2.5 Mohs' hardness.

[Claim 5] The constituent given [to claims 1-3] in any 1 term with which a bulking agent contains the zinc oxide which has about 4 Mohs hardness.

[Claim 6] In the method of mixing the staple fiber and at least one kind of bulking agent which consist of an aramid, and manufacturing the constituent by claims 1-5, for the fiber which consists of an aramid, although a Mohs' hardness is two or more It is dependent on the detailed opening which has the size H contained in the staple fiber which also averages the highest and consists of an aramid, and is conditional-expression: $M=2.75\times10-3\times H-2$ (among a formula the size H of a detailed opening). it is regarded as the value of 2000-5000A -- having -- the bulking agent which has Mohs' hardness M to satisfy -- Another bulking agent is added by the case 20 to 900% of the weight to the weight of the staple fiber which consists of an aramid. And the manufacture method of the aramid fiber constituent which introduces the produced mixture into the mixer which can transmit high shearing force to mixture, and is characterized by mixing until the end divided in the end of the staple fiber which consists of an aramid within mixture at plurality arises.

[Claim 7] The method according to claim 6 of cooling a constituent in temperature of a maximum of 80 degrees C in the case of mixed processing.

[Claim 8] The method according to claim 6 or 7 of using the staple fiber which consists of an aramid which has the length of about 6mm of averages in order to mix.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the constituent which contains at least the synthetic organic fiber and the bulking agent which consist of an aramid.

[0002]

[Description of the Prior Art] This kind of constituent is indicated by for example, the European Patent application public presentation No. 261820 specification. this -- a well-known constituent is used in order to manufacture the material which was hachures In order to manufacture the mold goods which should have high intensity especially, for example, flat packing, this well-known constituent is seldom suitable.

[0003]

[Problem(s) to be Solved by the Invention] Therefore, the technical problem of this invention was offering the constituent for manufacturing the mold goods which should have extraordinarily high intensity especially. Another technical problem of this invention was offering the manufacture method of this constituent.

[0004]

[Means for Solving the Problem] In the constituent of the kind indicated at the beginning, the above-mentioned technical problem is solved, when some bulking agents had the Mohs' hardness of 2-9 at least and the staple fiber has cloven to two or more fibrils at the end. the fibril to which especially the staple fiber met the fiber axis and which cracked and jumped out -- and it has cleavage advantageously

[0005] It became clear that especially the zinc oxide that has the Mohs' hardness of aluminum₄Si₄O₁₀(OH)₈ which have about two to 2.5 Mohs' hardness, or about 4 as a bulking agent is suitable. Measurement of a Mohs' hardness is Fahrenwald Trans.Am.Inst.Mining.Mat.Engrs.112, 88, and 1943. It carries out by the method indicated.

[0006] In the method of mixing the staple fiber and at least one kind of bulking agent which consist of an aramid, to the staple fiber which consists of an aramid, although a Mohs' hardness is two or more, the technical problem set up by this invention It is dependent on the detailed opening which has the size H contained in the staple fiber which also averages the highest and consists of an aramid, and is conditional-expression: $M=2.75 \times 10^{-3} \times H - 2$ (among a formula the size H of a detailed opening). it is regarded as the value of 2000-5000A -- having -- the bulking agent which has Mohs' hardness M to satisfy -- Another bulking agent is added by the case 200 to 900% of the weight to the weight of the staple fiber which consists of an aramid. And the produced mixture is introduced into the mixer which can transmit high shearing force to mixture, and it is solved by mixing until the end divided in the end of the staple fiber which consists of an aramid within mixture at plurality arises. Especially as a bulking agent, a mineral, for example, a kaolin, a magnesium oxide, a kaolin, a zinc oxide, an aluminum oxide, a chorus-singing stone, a quartz, or an inorganic fiber (it markets as a trademark, Inorphil, or rock wool) is recommended most. Of course, only what has a required Mohs' hardness corresponds to this bulking agent.

[0007] A well-known mixer corresponds in manufacture of the aramid pulp which has the energy expenditure high as a mixer and low rotational speed which can transmit high shearing force. The so-called Banbury mixer which has the Rota wing of a tangential direction especially here is recommended. However, the mixer which carries out friction processing of the mixture between two disks is also suitable.

[0008] In most mixers, you should consider so that this mixer may fully be cooled. It became clear that it is desirable especially to especially maintain the temperature of a maximum of 80 degrees C among a constituent during mixture with a Banbury mixer.

[0009] In order to mix a constituent, especially the staple fiber that has the length of about 6mm of averages and that consists of an aramid is suitable. Thus, the constituent which excelled for manufacturing mold goods, especially flat packing is obtained.

[0010]

[Example] Next, this invention is explained to a detail per following examples.

[0011] The staple fiber 1 by the conventional technology which consists of an aramid is shown in drawing 1 . A staple fiber 1 has the slight crack 4 in alignment with the fibril 3 and fiber axis of the frayed end 2 and some which clove slightly.

[0012] The staple fiber 11 which consists of an aramid contained in the constituent by this invention is shown in drawing 2 . Unlike the conventional technology, this staple fiber 11 has the fibril 12 to which plurality was divided in the end. The fibril 13 is more conspicuous in great numbers from the thing of the conventional technology like the crack 14 in alignment with the fiber axis. And a staple fiber 11 can have additionally the cleavage which met the fiber axis in addition.

mixing
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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the enlarged view of the staple fiber which consists of an aramid contained in the constituent by the conventional technology.

[Drawing 2] It is the enlarged view of the staple fiber which consists of an aramid contained in the constituent by this invention.

[Description of Notations]

1 11 Staple fiber 2 12 End 3 13 Fibril 4 and 14 crack 15 Cleavage

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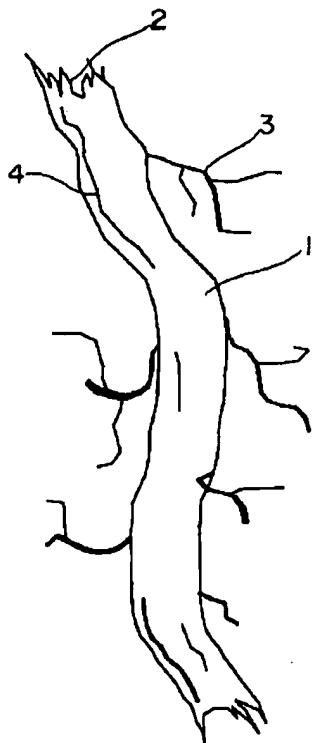
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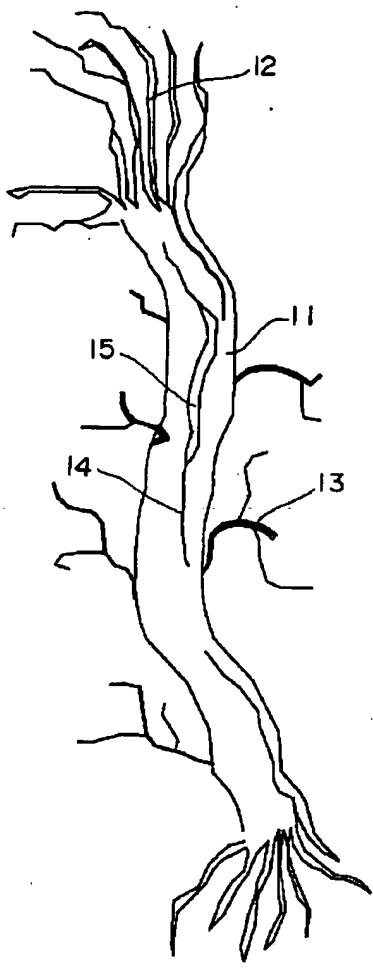
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DRAWINGS

[Drawing 1]



[Drawing 2]



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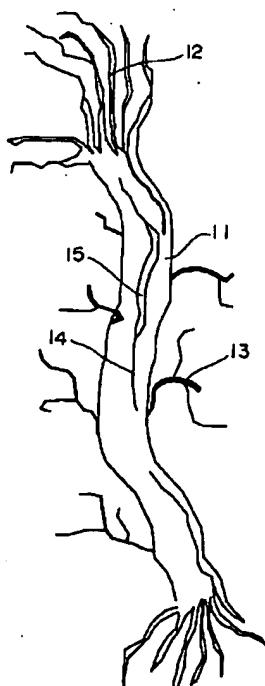
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(54)【発明の名称】アラミド繊維組成物、及び該組成物の製造方法

(57)【要約】

【目的】特別高い強度を有する成形品を製造するための、アラミド合成有機繊維及び充填剤を含有する組成物及びその製造方法を提供する。

【構成】該組成物は、少なくとも充填剤の一部が2~9のモース硬さを有し、かつ短纖維の末端が複数のフィブリルに開裂しており、特に短纖維が纖維軸に沿った亀裂、飛び出たフィブリル及び有利には開裂を有する。該組成物の製造方法は、アラミドからなる短纖維を所定のモース硬さの充填剤と高い剪断力を使用して混合することによりなる。



【特許請求の範囲】

【請求項1】 少なくとも、アラミドからなる合成有機短纖維(11)及び充填剤を含有する組成物において、少なくとも充填剤の一部が2~9のモース硬さを有し、かつ短纖維(11)がその末端で複数のフィブリル(12)に開裂していることを特徴とするアラミド纖維組成物。

【請求項2】 短纖維(11)が纖維軸に沿った亀裂(14)及び飛び出たフィブリル(13)を有する、請求項1記載の組成物。

【請求項3】 短纖維(11)が纖維軸に沿った開裂(15)を有する、請求項1又は2記載の組成物。

【請求項4】 充填剤が約2~2.5のモース硬さを有する $\text{Al}_4\text{Si}_4\text{O}_{10}(\text{OH})_8$ を含有する、請求項1から3までのいづれか1項記載の組成物。

【請求項5】 充填剤が約4のモース硬度を有する酸化亜鉛を含有する、請求項1から3までのいづれか1項記載の組成物。

【請求項6】 アラミドからなる短纖維と少なくとも1種類の充填剤を混合して請求項1から5による組成物を製造する方法において、アラミドからなる纖維に、モース硬さが2以上であるが、最高でも平均してアラミドからなる短纖維中に含まれる寸法Hを有する微細空隙に依存して条件式：

$$M = 2.75 \times 10^{-3} \times H - 2$$

(式中、微細空隙の寸法Hは、2000~5000Åの値と見なされる)を満足するモース硬さMを有する充填剤、アラミドからなる短纖維の重量に対して20~900重量%、場合により別の充填剤を加え、かつ生じた混合物を、高い剪断力を混合物に伝達できる混合機に導入し、混合物内でアラミドからなる短纖維の末端に複数に分裂した末端部が生じるまで混合することを特徴とする、アラミド纖維組成物の製造方法。

【請求項7】 混合処理の際に、組成物を最高80°Cの温度に冷却する請求項6記載の方法。

【請求項8】 混合するために平均約6mmの長さを有するアラミドからなる短纖維を使用する、請求項6又は7記載の方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、少なくとも、アラミドからなる合成有機纖維及び充填剤を含有する組成物に関する。

【0002】

【従来の技術】この種の組成物は、例えばヨーロッパ特許出願公開第261820号明細書に記載されている。該公知の組成物は、けばだった材料を製造するために使用される。特に高い強度を有するべき成形品、例えばフラットパッキングを製造するためには、該公知組成物はあまり適していない。

【0003】

【発明が解決しようとする課題】従って、本発明の課題は、特に、特別高い強度を有するべき成形品を製造するための組成物を提供することであった。本発明のもう1つの課題は、該組成物の製造方法を提供することであった。

【0004】

【課題を解決するための手段】上記課題は、冒頭に記載した種類の組成物において、少なくとも充填剤の一部が2~9のモース硬さを有し、かつ短纖維がその末端で複数のフィブリルに開裂していることにより解決される。特に短纖維は、纖維軸に沿った亀裂、飛び出たフィブリル及び有利には開裂を有する。

【0005】充填剤としては、約2~2.5のモース硬さを有する $\text{Al}_4\text{Si}_4\text{O}_{10}(\text{OH})_8$ ないしは約4のモース硬さを有する酸化亜鉛が特に適していることが判明した。モース硬さの測定は、Fahrenwald Trans. Am. Inst. Mining. Mat. Engrs. 112, 88, 1943に記載されている方法で実施する。

【0006】本発明で設定した課題は、アラミドからなる短纖維と少なくとも1種類の充填剤を混合する方法において、アラミドからなる短纖維に、モース硬さが2以上であるが、最高でも平均してアラミドからなる短纖維中に含まれる寸法Hを有する微細空隙に依存して条件式：

$$M = 2.75 \times 10^{-3} \times H - 2$$

(式中、微細空隙の寸法Hは、2000~5000Åの値と見なされる)を満足するモース硬さMを有する充填剤、アラミドからなる短纖維の重量に対して200~900重量%、場合により別の充填剤を加え、かつ生じた混合物を、高い剪断力を混合物に伝達できる混合機に導入し、混合物内でアラミドからなる短纖維の末端に複数に分裂した末端部が生じるまで混合することにより解決される。充填剤としては、特に鉱物、例えばカオリン、酸化マグネシウム、白陶土、酸化亜鉛、酸化アルミニウム、重唱石、石英又は無機纖維(商品名、Inorphilないしはロックウールとして市販)が最も推奨される。もちろん該充填剤には必要なモース硬さを有するものだけが該当する。

【0007】高い剪断力を伝達できる混合機としては、高いエネルギー消費量及び低い回転速度を有する、アラミドバルブの製造において公知混合機が該当する。特に、ここでは接線方向のロータ羽根を有する、いわゆるバンブリミキサーが推奨される。しかしながら、混合物を2つの円板の間で摩擦処理する混合機も適している。

【0008】大抵の混合機においては、該混合機が十分に冷却されるように配慮すべきである。特にバンブリミキサーでは、混合中に組成物中最高80°Cの温度を保つのが特に好ましいことが判明した。

【0009】組成物を混合するためには、平均約6mm

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の長さを有する、アラミドからなる短纖維が特に好適である。このようにして、成形品、特にフラットパッキングを製造するための優れた組成物が得られる。

【0010】

【実施例】次に、本発明を以下の実施例につき詳細に説明する。

【0011】図1には、従来技術による、アラミドからなる短纖維1が示されている。短纖維1は、ほつれた末端2及び数個の僅かに開裂したフィブリル3並びに纖維軸に沿った僅かな亀裂4を有する。

【0012】本発明による組成物中に含有されるアラミドからなる短纖維11は、図2に示されている。従来技術とは異なり、該短纖維11は末端に複数の分裂したフ

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ィブリル12を有する。纖維軸に沿った亀裂14同様フィブリル13は、従来技術のものよりも多数でより際立っている。しかも付加的に短纖維11は、なお纖維軸に沿った開裂を有することができる。

【図面の簡単な説明】

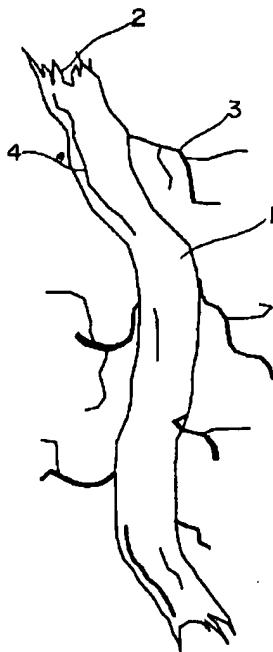
【図1】従来技術による組成物中に含有されるアラミドからなる短纖維の拡大図である。

【図2】本発明による組成物中に含有されるアラミドからなる短纖維の拡大図である。

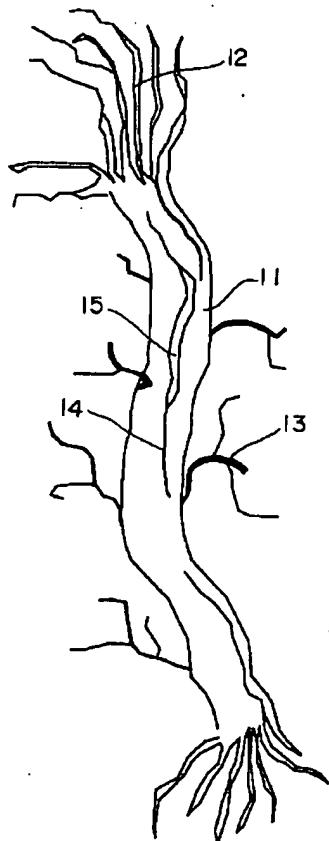
10 【符号の説明】

1, 11 短纖維、2, 12 末端、3, 13 フィブリル、4, 14 亀裂、15 開裂

【図1】



【図2】



フロントページの続き

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